DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 52-57, 60-65, 68, 72-77, 79-82, 85, 87 and 89 are rejected under 35 U.S.C. 102(b) as being anticipated by Williams et al. US Pat No 5,779,159).

Re claim 52, Williams et al. shows an apparatus for generating a mist (Fig. 2A) comprising: a housing (B) having a plurality of interior walls, at least one of the plurality of interior walls defining a passageway along a longitudinal center axis (PM), the passageway having a transport fluid inlet (W), a plenum (PM) adjacent to the transport fluid inlet, a portion (right side of O) adjacent to the plenum, and an outlet (left side of O), the at least one of the plurality of interior walls (PM, near O) being continuously tapered outwardly with respect to the axis along the portion and the plenum (PM) adjacent to the transport fluid inlet (W) being of different cross-sectional area than the transport fluid inlet at every point along the length of the plenum adjacent to the transport fluid inlet; a protrusion (S) with a solid interior located proximate the portion, the protrusion having an outer surface tapered outwardly with respect to the axis; a means for generating a mist substantially of a desired droplet size from a working fluid (F) with a transport fluid (W), the means including a transport nozzle (O) and a working nozzle (PO), the a transport nozzle being defined between the at least one of the

plurality of interior walls tapered outwardly with respect to the axis along the portion, and the outer surface tapered outwardly of the protrusion (S); the working nozzle (PO) being defined by other of the plurality of interior walls of the housing, the working nozzle being coincident the transport nozzle so that a the working fluid communicated to and exiting the working nozzle and the transport fluid communicated to and exiting the transport nozzle contact for the first time and mix; wherein the working nozzle is defined by a working nozzle outer surface facing inward toward the axis and a working nozzle inner surface facing outward away from the axis; wherein at least part of the working nozzle outer surface (X) converges toward the axis in a direction along the axis toward the outlet; and a working fluid inlet (F) disposed along the housing in communication with the working nozzle.

Re claim 53, Williams et al. shows a chamber (in front of S) adjacent the portion wherein the transport nozzle (O) exits into the chamber and the working nozzle (PO) exits into the chamber so that the working fluid communicated to the working nozzle mixes in the chamber with the transport fluid exiting the transport nozzle.

Re claim 54, Williams et al. shows an apparatus for generating a mist (Fig. 2a), the apparatus having an apparatus axis, the apparatus comprising: a housing (B), and a means for suppressing combustion with a mist, the means including: a first fluid passage (PO) formed in the housing having a first fluid inlet (F) and a first fluid outlet (PO); the first fluid passage defining a working nozzle; the first fluid passage comprising a first annular portion concentric with the apparatus axis, the first annular portion having a first outer surface facing inward toward the apparatus axis and a first inner surface

facing outward away from the apparatus axis; wherein at least part of the first outer surface (X) converges toward the apparatus axis in a direction toward the first fluid outlet; a second fluid passage (O) formed in the housing having a second fluid inlet (W) and a second fluid outlet (O); a protrusion (S) located in the second fluid passage to define an annular transport nozzle with a second inner surface facing outward away from the apparatus axis and a second outer surface facing inward toward the apparatus axis, that are both concentric with the apparatus axis and substantially frusto-conical in shape, and wherein the second inner surface and the second outer surface both diverge away from the apparatus axis in the direction toward the second fluid outlet (O); wherein the first fluid passage and second fluid passage are separate before the first fluid outlet and the second fluid outlet.

Re claim 55 & 74, Williams et al. shows a transport plenum (PM) within the apparatus and located in the second fluid passage between the second fluid inlet (W) and the transport nozzle (O).

Re claim 56, 75 & 77, Williams et al. shows the transport plenum (PM) and the transport nozzle (O) are arranged axially in the apparatus.

Re claim 57 &76, Williams et al. shows the transport plenum (PM) is concentric with the apparatus axis.

Re claim 60 & 79, Williams et al. shows a working fluid plenum (Fig. 2B, P) within the apparatus and located in the first fluid passage between the first fluid inlet (F) and the working nozzle (PO), wherein the working fluid plenum is annular and circumscribes the apparatus axis.

Re claim 61 & 80, Williams et al. shows the working fluid plenum (P) substantially circumscribes the transport nozzle (O).

Re claim 62, Williams et al. shows the working fluid plenum (P) substantially circumscribes the protrusion (S).

Re claims 63 & 81, Williams et al. shows the working nozzle (PO) has inner and outer surfaces at the first fluid outlet, each being substantially frusto-conical in shape, wherein the inner surface of the working nozzle faces outward away from the apparatus axis and the outer surface of the working nozzle faces inward toward the apparatus axis.

Re claims 64 & 82, Williams et al. shows wherein the working nozzle (PO) substantially circumscribes the transport nozzle (O).

Re claim 65, Williams et al. shows wherein the working nozzle (PO) substantially circumscribes the protrusion (S).

Re claims 68 & 85, Williams et al. shows a mixing chamber (Fig. 2A, far left), wherein the first fluid outlet (PO) and second fluid outlet (O) are connected to the mixing chamber.

Re claims 70 & 87, Williams et al. shows the transport nozzle (O) is shaped with a convergent-divergent profile (the nozzle converges toward O in the flow direction and diverges away from O in the flow direction) capable of providing supersonic flow of the transport fluid which flows there through.

Re claims 72 & 89, Williams et al. shows to spray water droplets on the fire (abstract).

Re claim 73, Williams et al. shows an apparatus for generating a mist (Fig. 2A), the apparatus having an apparatus axis and an outlet end, the apparatus comprising: a first fluid passage (P) having a first fluid inlet (F) and a first fluid outlet (PO); the first fluid passage defining a first nozzle; the first fluid outlet being annular and concentric with the apparatus axis, the first fluid passage comprising a first annular portion (P) concentric with the apparatus axis, the first annular portion having a first outer surface facing inward toward the apparatus axis and a first inner surface facing outward away from the apparatus axis; wherein at least part of the first outer surface (X) converges toward the apparatus axis in a direction toward the outlet end; a second fluid passage (PM) having a second fluid inlet (W) and a second fluid outlet (O); the second fluid passage defining a second nozzle; the second fluid outlet being annular and concentric with the apparatus axis, the second fluid passage comprising a second annular portion concentric with the apparatus axis, the second annular portion having a second outer surface facing inward toward the apparatus axis and a second inner surface facing outward away from the apparatus axis; wherein at least part of the second outer surface (O) diverges away from the apparatus axis in a direction toward the outlet end; and wherein at least part of the second inner surface (S) diverges away from the apparatus axis in a direction toward the outlet end; and wherein the second fluid outlet is located between the first fluid outlet (PO) and the apparatus axis.

Claim Rejections - 35 USC § 103

Claims 66, 67, 69, 83, 84 & 86 rejected under 35 U.S.C. 103(a) as being unpatentable over Williams et al. US Pat No 5,779,159).

Re claims 66 & 83, Williams et al. discloses the claimed invention except for the transport nozzle having an exit area to throat area ratio in the range of 1.75 to 15. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the exit area to throat area ratio in the range of 1.75 to 15, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

It would have been obvious to utilize a ratio in the range of 1.75 to 15 for the transport nozzle exit area to throat area in order to ensure a free flow of the liquid at the exit.

Re claims 67, 69, 84 & 86, Williams et al. discloses the claimed invention except for an included angle of 6 or 12 degrees. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to include an angle of 6 or 12 degrees, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

It would have been obvious to utilize an angle of 6 or 12 degrees for the transport nozzle to have a wider dispersal pattern.

Claims 71 and 88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williams et al. (US Pat No 5,779,159) as applied to claims 52-57, 60-70, 72-77, 79-87 and 89 above, and further in view of Pennamen et al. (5,810,252).

Re claims 71 and 88, Williams et al. teaches a primary fluid and an additive fluid as well as that the working fluid is water (Fig. 2B, W and column 3, lines 7-11).

Williams et al. does not teach a steam generator or that the transport fluid is steam.

However, Pennamen et al. teaches steam (column 2, lines 64-65), which would inherently come from something generating the steam, for atomization.

Therefore it would have been obvious to one of ordinary skill in the art to make the primary fluid of Williams et al. steam as taught by Pennamen et al. to aide in atomization (col. 2, 52-55).

Response to Arguments

Applicant's arguments filed 10/26/2011 have been fully considered but they are not persuasive. Re applicant's arguments, beginning with those directed toward claim 52 on page 6, figures 1 and 2a/2b of Williams do in fact differ, specifically element X in figures 2a/2b is not present in figure 1. Further, Williams calls figures 2a/2b as a variation of the embodiment displayed in figure 1 under the brief description of the drawings in the specification. As this appears to be the reason applicant has decided that the previous concession made in the entirely different 103 rejection of the office action dated 7/21/2010 should still stand, this argument holds no water and the 102(b) rejection made in the action dated 4/26/2011 shall be maintained. This specific response also applies the arguments of claim 54 on page 12 and claim 73 on page 17.

Further, applicant argues that element W of Williams refers to "water" and that element I is in fact the transport fluid inlet, any inlet with the structure claimed is cable of being a "transport fluid inlet" and as such, the examiner has likened said limitation to element W of Williams. Also, applicant argues that element PM of Williams refers to a

"sleeve" or "passageway defining means" and not the claimed passage way along a longitudinal axis or plenum, however examiner likens element PM as the passageway along a center axis with the plenum in the interior of said passageway.

Applicant's next argument centers on utilizing element I as the transport fluid inlet which the examiner did not state in the action dated 4/26/2011. Applicant appears to be arguing the incorrect action.

Applicant then argues that figure 2A of Williams as properly construed does not teach “the protrusion having an outer surface tapered outwardly with respect to the axis” however, the claimed limitation as properly construed requires "an outer surface" of the protrusion, and as can be seen from figure 2A of Williams, at least one surface of the protrusion is in fact tapered outwardly with respect to the axis.

Next applicant argues that figure 2A as properly construed does not teach that the working fluid and transport fluid only contact once and mix for the first time upon their exiting the respective nozzles. However, the fluid specifically entering the transport fluid nozzle is in fact only coming into contact and mixing with the fluid exiting the working fluid nozzle for the first time and only once when both have exited their respective nozzles.

Further, applicant argues that figure 2A construed properly does not teach that the surfaces making up the transport nozzle are not both tapered outwardly. However, as can be seen best in figure 2B, the inner surface of the transport nozzle, element O, is obviously tapered outwardly, while the outer surface of the protrusion, element S, is in fact ever so slightly tapered outwardly.

Beginning with those appearing on page 12, applicant argues that for claim 54, element O is utilized for 3 different elements, however, applicant is combining the rejections of two distinct independent claims, 52 and 54, where these two rejections cannot be construed together. Further, applicant argues that element PO is just the "discharge outlet of passageway P, but examiner likens element PO as a passage leading to an outlet. Further still" applicant again argues element W represents "water" but as discussed above the examiner considers element W to be inline with the claimed second fluid inlet.

Next applicant argues that figure 2A of Williams does not teach the second inner surface and second outer surface as frustoconical. However, the second inner surface is part of the protrusion which is in fact frustoconical and the second outer surface is part of the nozzle O which is also substantially frustoconical.

Further, applicant argues that the second inner surface shown in figure 2A does not diverge away as claimed, however, as discussed previously the surface of the protrusion does in fact diverge away and is not parallel as applicant has stated.

Applicant next argues that Williams does not show the first fluid passage and second fluid passage are separate before the first fluid outlet and the second fluid outlet. However, as can be seen from figure 2A they are separated by a wall that makes up the separate passages O and PO.

Regarding applicant's beginning arguments of claim 73, element P is the first fluid passage and also the wall with the first angular portion. Element W has been

discussed previously. Element O is the second fluid outlet and also nearest to the second outer surface.

Next applicant argues that the second nozzle does not include the second fluid plenum, however PM is in fact the plenum for second nozzle O. Further the applicant again argues that the second inner surface of the second nozzle does not diverge, however as stated previously it is in fact not parallel and does diverge slightly.

Finally, applicants arguments of the 103 rejections in the office action dated 4/26/2011 all hinge upon the arguments made for the independent claims 52, 54 and 73. As these are being maintained, so shall the 103 rejections. Applicant's argument that no motivation to combine exists, applicant is mistaken as motivations are in fact provided on pages 7 and 8.

In conclusion all rejections shall be maintained.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to STEVEN M. CERNOCH whose telephone number is (571)270-3540. The examiner can normally be reached on IFP.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Len Tran can be reached on (571)272-1184. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. M. C./
Examiner, Art Unit 3752
1/29/2012
/Jason J Boeckmann/
Primary Examiner, Art Unit 3752